Figure 1.

Water Resources Development Appropriations for the U.S. Army Corps of Engineers (Corps), Bureau of Reclamation (Bureau), Soil Conservation Service (SCS), and Tennessee Valley Authority (TVA)

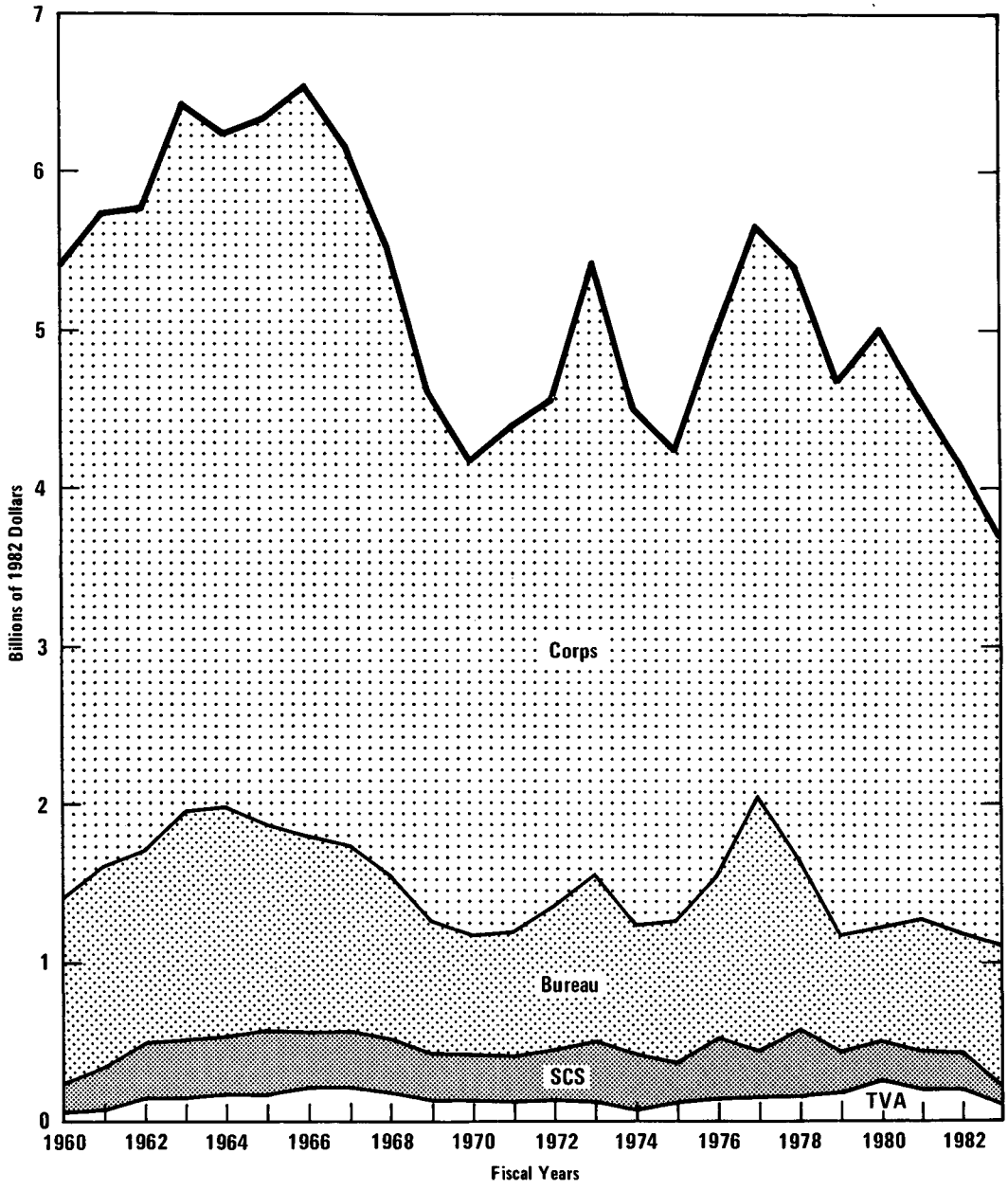


Figure 2.

Corps of Engineers' Construction Appropriations for Flood Control, Multipurpose Reservoirs, and Navigation (Inland Waterways and Ports and Harbors)

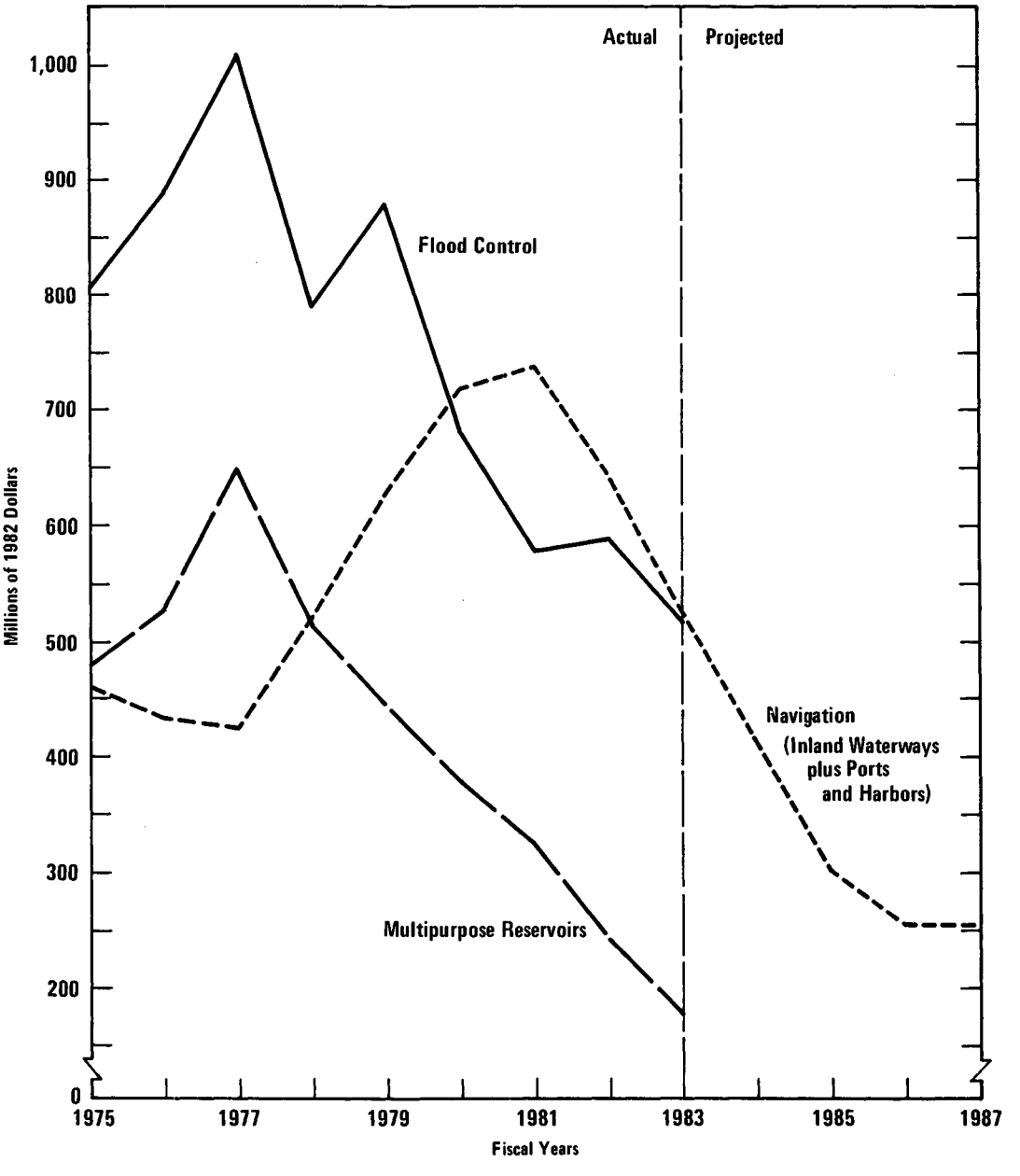
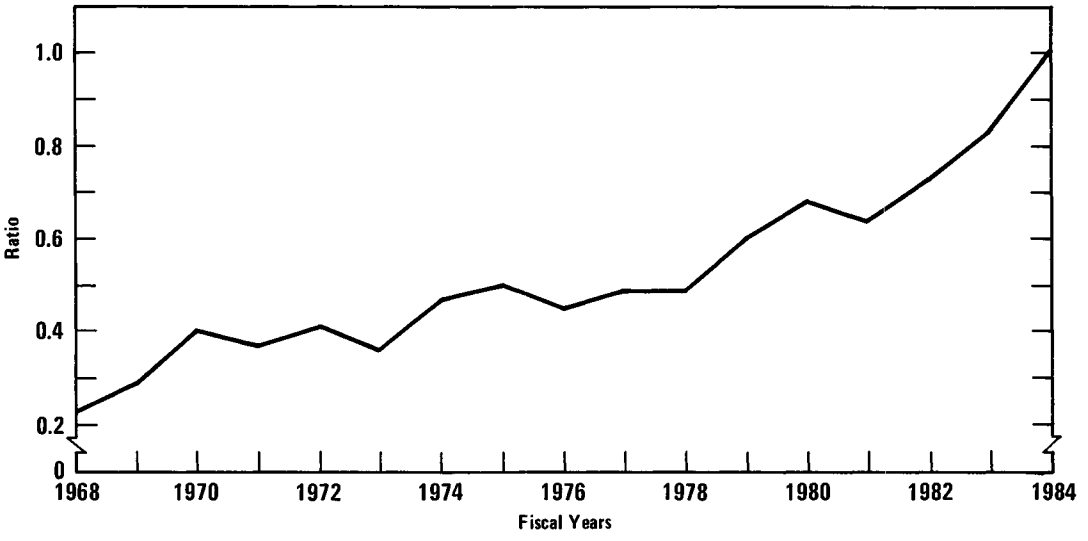


Figure 3.

Ratio of Combined Operation, Maintenance, and Rehabilitation Appropriations to New Construction Appropriations of the Corps of Engineers, Bureau of Reclamation, and Tennessee Valley Authority



HISTORY OF COST-SHARING POLICIES AND RECENT EVENTS

The authorization acts for federal water resource projects dating back to the turn of the century have, over time, established water project cost-sharing conventions for the federal water agencies. The most important pieces of legislation are included in Table 1, arranged by water project purpose. In addition to these, there have been a great number of authorization acts that have affected cost sharing for one purpose or one agency, but these were generally of little significance compared to the overall policies contained in the major acts.

Before 1978, no Administration successfully consolidated federal water projects cost-sharing policies, but in that year, President Carter made another attempt with his series of water policy initiatives to the Congress, one of which pertained to cost sharing. The cost-sharing initiative had two parts:

- States would provide a legally binding commitment to contribute up-front cash for projects within their borders--10 percent of construction costs for projects that had vendible outputs and 5

TABLE 1. MAJOR FEDERAL LEGISLATION AUTHORIZING COST SHARING, BY PROJECT PURPOSE

Water Resources Development Purpose	Affected Agency	Authorizing Legislation
Urban Flood Damage Reduction	Corps	Flood Control Act of 1936 (P.L. 74-738)
		Flood Control Act of 1938 (P.L. 75-761)
Rural Flood Damage Reduction	SCS	Watershed Protection Act (P.L. 83-566)
	Corps	Flood Control Act of 1936 Flood Control Act of 1938 Flood Control Act of 1928 (P.L. 70-391)
	Bureau	Small Projects Act (P.L. 84-984) Reclamation Projects Act of 1939 (P.L. 76-260)
	TVA	TVA Act (P.L. 73-017)
Drainage	SCS	Soil Conservation Act (P.L. 40-460) Watershed Protection Act
	Corps	Flood Control Act of 1944 (P.L. 78-534)
Irrigation	SCS	Soil Conservation Act Watershed Protection Act
	Corps	Flood Control Act of 1944 Reclamation Act of 1902 (P.L. 57-161)
	Bureau	Small Projects Act Reclamation Projects Act
Municipal and Industrial Water Supply	SCS	Watershed Protection Act
	Corps	Water Supply Act of 1958 (P.L. 85-500)

(Continued)

TABLE 1. (Continued)

Water Resources Development Purpose	Affected Agency	Authorizing Legislation
Water Supply (Continued)	Bureau	Small Projects Act Reclamation Projects Act
Stream Flow Regulation	Corps	Federal Water Pollution Control Act of 1961 (P.L. 87-088)
Water Quality (Point Source)	Corps	Federal Water Pollution Control Act of 1972 (P.L. 92-500)
Fish and Wildlife	SCS	Watershed Protection Act
	Corps	Flood Control Act of 1944 Water Resources Protection Act of 1965 (P.L. 89-072) Water Resources Development Act of 1974 (P.L. 93-251)
	Bureau	Water Resources Development Act of 1974
Ports and Harbors	Corps	Rivers and Harbors Act of 1920 (P.L. 66-263)
Inland Waterways	Corps	Rivers and Harbors Act of 1920
	TVA	TVA Act
Hydropower	Corps	Flood Control Act of 1944 1937 Bonneville Power Act (P.L. 75-329)
	Bureau	Reclamation Projects Act
	TVA	TVA Act
Area Redevelopment	Corps	Economic Development Act of 1965 (P.L. 89-136)
	TVA	TVA Act

50-549 O - 85 - 2

percent of construction costs for other projects. Vendible outputs included water supply, irrigation, power, and other benefits for which the federal government received revenues under former policies. A cap equal to one-fourth of one percent of the state's general revenues would be placed on a state's total yearly contribution. Revenues collected from the sale of vendible outputs would be shared between the federal government and the contributory states in proportion to their investments.

- Existing cost-sharing conventions for all agencies involved in flood control or flood damage reduction would be amended to require a standard 20 percent nonfederal contribution both for structural and nonstructural measures. Prior to this rule, different agencies used different nonfederal cost shares for structural and nonstructural plans.

President Carter's proposed cost-sharing policy was never enacted into law. The Corps, however, made several temporary administrative changes in provisions for preauthorization survey reports whereby the President's cost-sharing proposal would be incorporated in the agency's recommended levels of cost sharing for new projects.

Recognizing the role of the federal government in developing the nation's water resources, President Reagan directed his Cabinet Council on the Environment to study the issue of cost sharing and to make recommendations that would help promote new projects within the federal program. The Working Group on Water Resources of the Cabinet Council forwarded their recommendations to the President in August 1982. Although the findings have not been officially released yet, the cost-sharing proposal for Corps projects contained in a bill recently submitted by Senator Stafford (S. 1031) apparently reflects the working group's recommendations (see Table 2).

The Corps of Engineers' new projects for 1983 have stirred controversy in the water community because they introduced a cost-sharing precedent independently and in advance of the Administration's official policy on cost sharing. While the Corps' administrative proposals were not as comprehensive as Senator Stafford's bill, three aspects common to both proposals are certain to focus cost-sharing debate during the 98th Congress. First, the states or other nonfederal participants will be asked to bear more of the cost of jointly developed water projects. They will also be asked to contribute a greater portion in up-front financing (cash or contributions in-kind) than they now contribute. Finally, by requiring 100 percent up-front financing for hydropower and municipal and industrial water supply projects, the proposals are, in effect, urging states and local government to handle these projects without federal assistance.

TABLE 2. PROPOSED COST SHARING FOR NEW WATER PROJECTS AFTER 1983

Project Purpose	Up-Front Nonfederal Share of Costs (In percents)
Hydropower	100
Municipal and Industrial Supply	100
Flood Control	35
Recreation	50 a/
Commercial Navigation	75 b/
Irrigation	35
Beach Erosion	50

SOURCE: S. 1031.

a. Could be repayment instead of up-front.

b. Twenty-five percent of federal financing is reimbursable; the rest must be up-front cash contribution.

It appears that these concepts may now be more acceptable to local water project proponents than they were during the Carter Administration. The Colorado River Basin Project Act Amendments of 1982 (P.L. 97-373) required that nonfederal interests contribute 20 percent of selected features of the Central Arizona Project, a major Bureau project bringing Colorado River water to Phoenix and Tucson. Local farmers have already gone to the bond markets to obtain private financing. Each of nine new project starts proposed by the Corps in 1983 had a local financing component endorsed by local sponsors ranging from 35 percent of urban flood control projects to 100 percent of hydroelectric project costs.

SCOPE AND ORGANIZATION OF THE PAPER

The remainder of this paper is devoted to the presentation of sufficient baseline information, so that future cost-sharing proposals can be evaluated against current policy with a realistic assessment of state and local capabilities.

Chapter II presents a detailed discussion of the current nominal and effective cost-sharing policies of each of the four major federal water agencies for all types of water development projects. Nominal rates are those cost percentages contained in authorizing legislation that, theoretically, the nonfederal participants will have to pay. In practice, however, they frequently bear little relationship to the amounts nonfederal participants actually pay, because of interest rate subsidies and extended periods for repayment. Effective composite cost-sharing rates--combined capital and operating payments expressed in present value terms--are also presented. Effective rates were calculated on the basis of how much the federal and nonfederal participants actually paid for almost 4,800 water projects. 2/ Effective rates are then compared to nominal rates.

Chapter III presents existing state mechanisms for raising water development funds. Included are the use of appropriations from general revenues, debt financing (general obligation and revenue bonding), dedication of special taxes, and collection of user fees. The use of special or revolving funds and loan and grant programs for distribution of state funds are also documented. Chapter IV presents legal, institutional, and financial impediments that could prevent states from expanding their role in water project financing or cost sharing.

2/ See U.S. Water Resources Council, Options for Cost Sharing--Parts 1-8 (1975), a report submitted to the President pursuant to Section 80 of the Water Resources Development Act of 1974 (P.L. 93-251).

CHAPTER II. NOMINAL AND EFFECTIVE COST-SHARING POLICIES FOR FEDERAL AND STATE WATER RESOURCES DEVELOPMENT

The first section of this chapter presents the current nominal cost-sharing rates for the Corps of Engineers (Corps), the Bureau of Reclamation (Bureau), the Soil Conservation Service (SCS), and the Tennessee Valley Authority (TVA), and discusses the legislative background for cost sharing within each agency. Nominal rates are those found in authorizing legislation. In practice, actual or effective cost-sharing rates can differ considerably. The reasons for this divergence and effective rates for each agency are presented in the second part of this chapter.

NOMINAL FEDERAL COST-SHARING POLICIES

Nonfederal participants in federal water projects (state or local governments and private users) are generally required to finance or to pay some portion of project costs. This requirement varies according to the type of project, lead federal agency, and special provisions that can be established by the Congress.

Corps of Engineers Cost-Sharing Policy

The Corps' current cost-sharing requirements have been established by law or by administrative rules for each of the 25 project purposes listed in Table 3. The final cost-sharing split between federal and nonfederal participants for a multipurpose project is determined during the pre-authorization project feasibility study, based on the mix of benefits contained in the project. For instance, the total nonfederal share of a multipurpose reservoir providing navigation, irrigation, flood control, and hydropower benefits would be derived by multiplying the nonfederal rate for each type of benefit by the allocated costs to that type of benefit and adding the results.

Navigation. Legal precedent for federal interest in navigation stems from the Commerce Clause of the United States Constitution and subsequent Supreme Court decisions. Section 2 of the Rivers and Harbors Act of 1920 directed the Chief of Engineers to determine the general versus the

TABLE 3. TRADITIONAL CORPS OF ENGINEERS COST-SHARING POLICY

Purpose	Construction Costs Participation a/		Lands, Easements, Rights-of-Way, and Relocations	Operation and Maintenance
	Federal (In percents)	Nonfederal Cash (In percents)		
Navigation				
Commercial--general navigation facilities	100	0	Nonfederal	Federal
Recreation--general navigation facilities	50	50	Nonfederal	Federal
Flood Control				
Major reservoirs	100	0	Federal	Federal
Local protection--structural	100	0	Nonfederal b/	Nonfederal
Local protection--nonstructural	80	20 c/	Federal d/	Nonfederal
Small reservoirs in lieu of local protection	100	0	Nonfederal b/	Nonfederal
Major drainage	50	50 c/	Nonfederal b/ c/	Nonfederal
Beach Erosion Control				
Federally owned shores	100	0	Federal	Federal
Publicly owned shores (nonfederal)	50	50	Nonfederal	Nonfederal f/
Private shores--publicly used	50 d/ e/	50	Nonfederal	Nonfederal f/
Private shores--nonpublicly used	0	100	Nonfederal	Nonfederal
Public shore parks (nonfederal)	70	30	Nonfederal	Nonfederal f/
Hydroelectric Power	100	Repay	g/	Nonfederal

(Continued)

SOURCE: U.S. Army Corps of Engineers, Digest of Water Resources Policies and Authorities (March 27, 1981).

a. Construction costs include post-authorization and engineering and design.

b. Local cooperation requirements based on Section 3 of the 1936 Flood Control Act, as amended, consist of providing lands, easements, rights-of-way; holding and saving the United States free from damages; and maintaining and operating the project after completion. In addition, it is policy to require a local cash contribution in windfall land enhancement cases to equal 50 percent of total project costs allocated to land enhancement benefits.

c. Costs for determination of local share include costs of lands, easements, rights-of-way, and relocations. This results in a required local cash contribution for some projects.

d. Lands, easements, rights-of-way, and relocations are shared on the same basis as the construction costs.

e. The 50 percent federal participation is multiplied by the ratio of public benefits to total benefits along the subject private shores. The local share includes the costs allocable to private benefits.

TABLE 3. (Continued)

Purpose	Construction Costs Participation a/		Lands, Easements, Rights-of-Way, and Relocations	Operation and Maintenance
	Federal (In percents)	Nonfederal Cash (In percents)		
Water Supply	100	Repay	g/	Nonfederal
Irrigation (storage)	50	50	g/	Nonfederal
Recreation and Fish and Wildlife				
Reservoir projects--separable costs	50	50	g/	Nonfederal
Reservoir projects--joint costs	100	0	Federal	Federal
Nonreservoir projects	50	50 c/	Nonfederal	Nonfederal
Enhancement of Fish and Wildife and Anadromous Fish (resource enhancement)				
Separable costs	75	25	g/	Nonfederal
Joint costs	100	0	Federal	Federal
Anadromous fish--federal program	100	0	Federal	Federal h/
Anadromous fish--other	75	25	g/	Nonfederal
Enhancement of Commercial Fish (excluding anadromous fish)	100	0	Federal	Federal
Mitigation of Project-Caused Damages (including fish and wildlife damages)	i/	i/	i/	i/
Aquatic Plant Control				
Research, planning, evaluation	100	0	Not Applicable	Not Applicable
Control	70	30	Not Applicable	30 percent Nonfederal

f. Periodic beach nourishment (sand replacement) is defined in law as construction and eligible for federal participation for the period specified in project document.

g. Costs are allocated to the project purposes and shared on the same basis as construction costs for each purpose.

h. Maintenance by federal agency other than Corps of Engineers.

i. Cost sharing is the same as for the purposes causing the damages (causative purposes). The entire costs of mitigation--including construction, land required for mitigation, and computed present worth of future operation and maintenance--are cost shared on the same basis as the purpose causing the damage. Responsibility for actual performance of O&M is normally assigned to nonfederal interests.

special interest in navigation improvements and to recommend an appropriate sharing of costs between federal and nonfederal interests. The federal share in such improvements varies from 50 to 100 percent, depending on the nature of the service rendered, the incidence of benefits to the general public, and the project classification of commercial or recreational navigation.

Federal participation is generally limited to financing and paying for general navigation features, such as breakwaters, jetties, entrance and primary access channels, turning basins, and anchorage areas. Nonfederal interests generally pay for terminal facilities; dredging in berthing areas; interior access channels; lands, easements, and rights-of-way; and disposal areas for dredged material. The federal government pays all maintenance dredging costs for these projects.

The federal government also pays for all inland waterway construction, dredging, and lock and dam construction. Operation and maintenance (O&M) costs are also paid by the federal government, although under the Inland Waterways Revenue Act of 1978 (P.L. 95-502) a small user fee is collected in the form of a tax on maritime fuel (equal to roughly 6 percent of 1982 federal expenditures for waterways).

Flood Control. In 1936, the Flood Control Act established a national policy on flood control of navigable waters or their tributaries, which set forth this objective as a proper activity of the federal government in cooperation with state and local entities. Subsequent acts have enlarged the federal role, under the name of flood plain management, to include all alternatives in controlling flood waters, reducing the susceptibility of property to flood damage, and relieving human and financial loss.

Between 1936 and 1941, several water project authorization acts established the Corps' flood control cost-sharing policy. Traditionally, the federal government has paid construction and maintenance costs for flood control lakes. The federal government also pays the construction costs of other structural controls (flood walls, levees, and so forth), but maintenance financing is totally local. Construction costs for nonstructural alternatives (relocation, floodproofing, early warning systems) are shared, with 80 percent paid by the federal government and 20 percent by nonfederal units.

Hydroelectric Power. Through authorizing legislation, the Congress has directed the Corps to secure full repayment of costs of hydroelectric power generation through the sale of electricity by marketing agencies. Under Section 5 of the Flood Control Act of 1944, Corps-produced hydropower is marketed by the Department of Energy and revenues are returned to the Treasury.

Recreation. Both the Flood Control Act of 1944 and the Federal Water Project Recreation Act of 1965 authorized the Corps to participate in and share the financial responsibilities of water-based recreation development. Construction costs are shared on a 50/50 basis and maintenance is 100 percent nonfederal.

Water Supply. Municipal and industrial water supply storage space may be recommended for inclusion in any Corps reservoir pursuant to the Water Supply Act of 1958. Costs are federally financed but are repaid by water sales within 50 years, including interest set by law. The act permits an interest-free development period for up to ten years.

Fish and Wildlife. The Fish and Wildlife Coordination Act of 1958 provided that fish and wildlife conservation should receive equal consideration with other project purposes. Those costs identified as separately allocable for this purpose are shared on a 75 percent federal and 25 percent nonfederal basis. Nonfederal entities are responsible for all operation, maintenance, and replacement costs.

Bureau of Reclamation Cost-Sharing Policy

Cost sharing of Bureau projects is also determined according to project purposes. Both reclamation law and administrative policy comprise the basis for cost-sharing conventions within each purpose. Each project purpose is discussed below (also see Table 4).

Irrigation. The Reclamation Act of 1902 established a revolving fund from the sale of public lands to provide financing for western irrigation projects. The intent of the act was to avoid using appropriations from general revenue for reclamation; rather, the fund, replenished with farmers' repayment in full of interest-free loans, was to be self-sustaining. Charges on reclamation projects often exceeded original estimates, however, and farmers were often unable to meet their repayment obligations.

The Reclamation Project Act of 1939 provided that project costs allocated to irrigation be repaid by users only to the extent that they were able to repay. These provisions still prevail and, consequently, there is no set nonfederal cost sharing for Bureau irrigation projects. Studies must be undertaken to determine the incremental value of irrigation water and the farmers' ability to pay based on farm budgets. Projects are financed entirely by the federal government and costs are repaid without interest. Farmers or irrigation districts are responsible for all operation and maintenance costs.

TABLE 4. NONFEDERAL COST-SHARING REQUIREMENTS FOR BUREAU OF RECLAMATION PROJECTS, BY PURPOSE (In percents)

Purpose	Capital	Operation and Maintenance
Irrigation	Varies according to "ability to pay," but generally less than 20 percent.	100
Municipal and Industrial Supply	100	100
Hydroelectric Power	100	100
Fish and Wildlife	25	100
Recreation	50	100
Water Quality	25	100

SOURCE: Bureau of Reclamation, Reclamation Instructions, Part 116, "Economic Investigations."

Municipal and Industrial (M&I) Supply. Two pieces of legislation form the authority for cost recovery for Bureau M&I projects--the Reclamation Project Act of 1939 and the Water Supply Act of 1958. Costs allocated to M&I supply, including interest during construction, are to be repaid in full with interest on the unpaid balance within 50 years of the initial service. The cost of operation and maintenance usually is combined with capital costs in calculating an appropriate repayment water rate based on current and future demand.

Hydroelectric Power. General administrative policy of the Bureau directs that electric power in excess of project needs is to be sold commercially to pay operation and maintenance expenses, to amortize capital costs allocated to commercial power, and to assist in the repayment of costs allocated to irrigation and other project purposes. Both capital and maintenance costs of hydroelectric development are supposed to be repaid in full by users of federal hydropower.

Fish and Wildlife. The Federal Water Project Recreation Act of 1965 established cost-sharing policy for fish and wildlife enhancement or protection. For this purpose, the nonfederal share is 25 percent of capital costs (including interest) and 100 percent of operation and maintenance costs. Payment of the nonfederal share may be in-kind (land or facilities), cash repayments, or a combination of the two. Local sponsors do not have to repay those capital or operating costs that are not directly allocated to fish and wildlife (nonseparable costs).

Recreation. Cost sharing for recreation is also authorized under the Federal Water Project Recreation Act of 1965. The nonfederal share is 50 percent of separable recreation-related capital costs, including interest, and 100 percent of separable operation and maintenance costs. Land, facilities, and cash repayment may all be used for the nonfederal share. Recreation costs for facilities located within national forests, national recreation areas, or national parks administered by a federal agency are paid in full by the federal government.

Water Quality. Cost-sharing policy to ensure water quality was established by the Bureau to be consistent with Section 202 of the Federal Water Pollution Control Act Amendments of 1977. The nonfederal share is 25 percent of capital costs, including interest, plus 100 percent of operation costs. Repayment of capital costs may be made through (1) lump sum cash payment upon completion of water quality features, (2) repayment in-kind, or (3) cash repayment over a 50-year period with interest.

Soil Conservation Service Cost-Sharing Policy

The Soil Conservation Service's water program is composed of two subprograms with separate authorizations. Under the Watershed Protection and Flood Prevention Act of 1954 (P.L. 83-566), the SCS conducts the Small Watershed Program, which provides financial and technical assistance for land treatment, flood prevention, irrigation and drainage, recreation, fish and wildlife enhancement, and municipal and industrial water supply. Under the Flood Control Act of 1944 (P.L. 78-534), the SCS carries out separate flood prevention activities. Table 5 summarizes SCS cost-sharing conventions by project purpose.

Cost-sharing conventions are identical for projects under P.L. 78-534 and P.L. 83-566. For all project purposes, operation and maintenance costs are 100 percent nonfederal. Prior to construction, a Project Agreement document must be signed by the responsible nonfederal entity endorsing that the following three conditions are or will be satisfied:

- All land affected by the project will be purchased by or is already owned by the responsible nonfederal entity.
- The appropriate nonfederal share is secured in an escrow account and is available for payment of construction costs as performed and billed.
- Operation and maintenance will be performed and paid for by the nonfederal entity.

TABLE 5. NONFEDERAL COST-SHARING REQUIREMENTS UNDER SOIL CONSERVATION SERVICE SMALL WATERSHED AND FLOOD PREVENTION PROGRAMS (In percents)

Purpose	Construction	Operation and Maintenance
Land Management	Not to exceed the level of existing national programs (usually 50 percent)	100
Flood Prevention		
Structural	0	100
Nonstructural	20	100
Irrigation and Drainage	50	100
Recreation	50	100
Fish and Wildlife	50	100
Municipal and Industrial Supply	50	100
Water Quality	(not established)	
Energy	100	100

Tennessee Valley Authority Cost-Sharing Policy

The Tennessee Valley Authority Act of 1933, as amended, established the TVA, a regional development agency that was to be responsible for improvement of navigability and flood control of the Tennessee River, agricultural and industrial development of the Tennessee River Basin, and production and distribution of electric power to the region at the lowest practical prices. Prior to an amendment to the act in 1959, all TVA activities were funded solely through Congressional appropriations with no cost sharing by states or localities.

The amendments of 1959 required payments from the TVA to the U.S. Treasury from net power proceeds beginning in fiscal year 1961. Repayment is divided into a return on the net appropriation investment in power facilities and repayment of the dollar amount of invested capital. The amount of return payable each year is based on the appropriation investment at the beginning of that year and the average interest rate payable by the U.S. Treasury on its total marketable public obligations as of the same date. The capital repayment schedule was fixed at $10 million per year between fiscal years 1961 and 1965; $15 million per year between fiscal years 1966 and 1970; and $20 million each year thereafter, until a total of $1 billion had been repayed to the U.S. Treasury. As of the end of fiscal year 1982, a total of $370 million of the capital debt had been repayed. Return on appropriation investment totaled about $1.2 billion as of that time.

There are no nominal cost-sharing requirements associated with TVA projects comparable to those of the other three federal water agencies, because the TVA act, as amended, established repayment terms for federal outlays based on selling electric power rather than on the traditional procedure of allocating project costs and recovering portions of those costs according to specific nonfederal cost-sharing rates. It is possible, however, to calculate an effective cost-sharing rate by comparing repayment and return contributions to Congressional appropriations. In these terms, for all project purposes, the Water Resources Council calculated that the nonfederal cost share for all TVA capital costs was 79 percent; for operation and maintenance costs, the nonfederal share was 46 percent. 1/

These percentage cost shares are not equivalent to the nominal shares discussed for the other agencies. Rather, they were calculated as effective cost shares that array costs and repayments over the life of individual pro-

---

1. U.S. Water Resources Council, Options for Cost Sharing--Part 5A (1975), a report submitted to the President pursuant to Section 80 of the Water Resources Development Act of 1974 (P.L. 93-251).

jects expressed in terms of present value. This methodology is discussed in the next section.

EFFECTIVE COMPOSITE COST-SHARING RATES

For most joint federal/state water projects, nominal cost-sharing rates (those specified in authorizing legislation) will differ from the proportion of total project costs actually paid by each participant over the project life when summed in constant dollars. The latter circumstance is referred to as an effective cost share. Effective composite cost sharing rates are formed by combining effective capital cost shares with the capitalized present value of annual operation, maintenance, and rehabilitation expenses contributed by each participant over the project life. 2/Effective cost-sharing rates differ from nominal rates because of four factors:

- Timing of the nonfederal contribution either as up-front cash or as periodic repayments with fixed interest rates over long periods of time.
- Provisions for interest-free repayment or relaxation of repayment requirements entirely during construction or during a development period just after project completion.
- Magnitude and terms of transfer accounts whereby surplus revenues from one purpose, such as hydropower or M&I supply, are used to offset reimbursable costs of another purpose, such as irrigation.
- The value of in-kind payments such as land, easements, and rights-of-way for flood control projects.

This method of calculating ultimate cost burden provides an equitable way to compare disparate cost-sharing and repayment terms for 25 agencies

---

2. This calculation was performed by the Water Resources Council (WRC) for almost 4,800 joint federal and state projects based on a 6 percent discount rate and a project life of 50 years. Rates calculated by the WRC were used for purposes of this study. For more detail, see U.S. Water Resources Council, Options for Cost Sharing--Part 5A, Planning and Cost Sharing Policy Options for Water and Related Land Programs (November 1975).

and 30 types of water projects. For example, by computing the effective composite cost shares, the ultimate nonfederal cost burden associated with a Corps flood control reservoir can be compared with that for a Bureau flood control reservoir, even though the terms for capital and operating repayment, project life, or interest rates may differ.

This concept is also quite helpful in designing flexible repayment terms to satisfy an ultimate cost burden policy. That is, a 50 percent nonfederal share could be met with any combination of payments for construction or for operation and maintenance: cash up-front, periodic repayments with interest, contributions in-kind, or payments for operation and maintenance. A nonfederal participant in a federal water project could choose that combination best suited to its particular financial condition.

Overview of Effective Composite Cost Sharing

In 1975, the U.S. Water Resources Council (WRC) compiled cost-sharing information for 25 federal agencies involved in water resources planning, development, or management. From those data, the WRC calculated the mean effective composite cost share by project purpose for each agency from a total pool of nearly 4,800 projects (see Table 6). If recalculated today, the nonfederal cost-sharing rates reported in Table 6 would be lower, especially for projects that required capital repayment with interest. A 6 percent interest rate was used in the original WRC calculations, whereas an interest rate in the 8-10 percent range might be used today.

On average, nonfederal participants pay 30 percent and the federal government pays 70 percent of composite project costs. The national average nonfederal effective cost share is 24 percent for construction and 58 percent for operation and maintenance. Traditionally nonfederal water development purposes, such as municipal and industrial supply, water quality management, and hydroelectric generation, show the highest rates of nonfederal cost sharing. Also, these purposes are associated with vendible products. Low nonfederal cost sharing characterizes those purposes that are subsidized to achieve a development goal (irrigation, navigation) or those for which there is no vendible output (fish and wildlife, flood damage prevention). None of these justifications explains the low nonfederal share of recreation project costs.

In terms of federal spending to support the project purposes listed in Table 6, the three purposes with high nonfederal shares account for only 4 percent of the total present value of all costs of water development before fiscal year 1975. Federal water quality funding has increased

TABLE 6. EFFECTIVE NONFEDERAL COST SHARES OF FEDERAL WATER RESOURCES DEVELOPMENT, BY AGENCY
(In percents)

Purpose	Army Corps of Engineers	Bureau of Reclamation	Soil Conservation Service	25 Federal Agencies
		Multipurpose Dams		
Urban Flood Damage Reduction	17	a/	a/	20
Rural Flood Damage Reduction	7	10	27	11
Irrigation	19	18	54	19
Municipal and Industrial Supply	54	71	100	64
Hydroelectric Power	61	65	b/	64
Water Quality	3	82	b/	60
Fish and Wildlife	11	13	57	14
General Recreation	17	18	63	19
		Navigation Works		
Inland Waterways c/	6	7	b/	6
Commercial Harbors	16	b/	b/	16
All Navigation	7	7	b/	7
Agency Mean	20	37	49	30

SOURCE: Congressional Budget Office from Water Resources Council data. (TVA data not included.)

a. Agency reported a cost category for this purpose but not cost sharing.

b. Agency indicated no activity for this purpose.

c. Receipts from the fuel tax implemented pursuant to the Inland Waterway Revenue Act of 1978 are not included; estimates may therefore be slightly low.

dramatically since 1975, however, because of the Environmental Protection Agency's (EPA) sewage treatment facilities grant program. Those purposes with low nonfederal shares have accounted for 58 percent of the total federal investment in water development through fiscal year 1974. Recreation has accounted for about 6 percent of total federal water development appropriations through that year.